What is claimed is:

1. A method for creating refractive index changes in a substrate comprising:

irradiating the substrate with a pump radiation of wavelength greater than ultra-violet (UV) radiation,

generating UV radiation within said substrate responsive to said radiation such that the change in the refractive index of the substrate is generated responsive to said UV radiation.

2. The method of claim 1, wherein the pump radiation is infrared (IR) radiation.

3. The method of claim 1, wherein the pump radiation is visible light.

4. The method of claim 2, wherein the substrate comprises a glass doped with rare earth ions.

5. The method of claim 4, wherein the rare earth ions comprise at least one of Pr^{3+}, Er^{3+}, Eu^{3+}, Nd^{3+}, Ho^{3+}, Sm^{3+}, Tb^{3+}, Dy^{3+}, and Tm^{3+} ions.

6. The method of claim 4, wherein the rare earth ions comprise Tm^{3+} ions and the IR radiation increases the $^1G_6$ level population of the rare earth ions.

7. The method of claim 6, wherein at least one of the $^1D_2$ level population and the $^3P_0$ level population of the rare earth ions is increased by up-conversion of the $^1G_4$ level population.

8. The method of claim 7, wherein the rare earth ion emits the UV radiation.

9. The method of claim 1, wherein UV radiation creates defects in the substrate which cause a change in the refractive index of the substrate.

10. The method of claim 7, further comprising the step of: setting temperature conditions at which up-conversion in a substrate component takes place.

11. The method of claim 2, wherein the step of irradiating the substrate is performed by at least one pump IR emitting device for generating IR radiation with at least one pre-selected wavelength which generates a population up-conversion in a substrate component.

12. The method of claim 3, wherein the step of irradiating the substrate is performed by at least one pump visible light emitting device for generating visible light radiation with at least one pre-selected wavelength which generates a population up-conversion in a substrate component.

13. The method of claim 11, wherein the IR radiation contains at least one wavelength in the range of 600 nm to 1500 nm.

14. The method of claim 13, wherein the IR radiation contains at least one wavelength in the range of 1000nm to 1250nm.

15. The method of claim 14, wherein the IR radiation contains at least a wavelength of 1060nm.

16. The method of claim 14, wherein the IR radiation contains at least a wavelength of 1120 nm.

17. The method of claim 1, wherein the substrate comprises a rare earth ion doped optical fiber.

18. The method of claim 1, wherein the substrate comprises a Sb-silicate glass.

19. The method of claim 1, wherein the substrate comprises a germanate glass.

20. The method of claim 1, wherein the substrate comprises a tellurite glass.

21. A waveguide formed by the process of claim 1.

22. A substrate comprising:

a substrate matrix material;

at least one type of rare earth ion dopant in the matrix material; and

at least one defect in the matrix material which affects a refractive index of the substrate,

wherein said at least one defect was created by ultra-violet (UV) radiation emission from the rare earth ion dopants responsive to pump radiation at a wavelength longer than said UV radiation.

23. The substrate of claim 22, wherein the UV radiation is created by an up-conversion process which converts said pump radiation to UV radiation.

24. The substrate of claim 22, wherein the rare earth ion dopants comprises Tm^{3+} ions.

25. The substrate of claim 24, wherein the substrate comprises an optical fiber, whose core is doped with the Tm^{3+} ions.

26. The substrate of claim 24, wherein the substrate comprises a Sb-silicate glass.

27. The substrate of claim 24, wherein the substrate comprises a germanate glass.

28. The substrate of claim 24, wherein the substrate comprises a tellurite glass.

29. A method of making a glass substrate comprising the steps of:

doping the glass substrate with fluorescent ions; and

pumping radiation into the glass substrate,

wherein ultra-violet (UV) radiation is generated in said substrate by said fluorescent ions responsive to said pump radiation to create defects in the substrate such that a change in a refractive index is generated.

30. The method of claim 29 wherein the pump radiation is infrared (IR) radiation.

31. The method of claim 29 wherein the pump radiation is visible light radiation.

32. The method of claim 29, wherein the glass substrate comprises an optical fiber doped with Tm^{3+} fluorescent ions.

33. The method of claim 30, where the step of pumping IR radiation is performed by a semiconductor diode.

34. The method of claim 30, wherein the step of pumping IR radiation is performed by a Raman pump laser.